On the pendulum oscillations of a suspended RF resonant circuit

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Abstract: *The period of the pendulum oscillations of a suspended electromagnetic resonant circuit formed by quarter-wavelength transmission line sections is found to be affected by electrical paremeters of the oscillator driving it. Of particular influence appears to be the magnitude of current at resonance, which depends on the effective quality factor (Q) of the RF tank circuit and the input driving power.*

ELECTRICAL DESCRIPTION

In the initial experiment, the resonator is formed by eight quarter-wavelength, two-wire transmission line sections, all set up in a radial form, and spaced at 45 degrees to each other. The ends of the transmission lines pointing to the center of the thus formed star are connected in parallel. The free ends of the transmission lines are short-circuited. Each transmission line lies in one vertical plane The whole arrangement resembles a beam-made discoid resonator, with contact points at the two poles. The resonant frequency is approximately 100MHz and is reduced to 70MHz when the resonator is loaded by the driving power oscillator circuit.

PHYSICAL ARRANGEMENT

The whole arrangement is suspended as a pendulum, with the power oscillator assembled on a circuit board measuring approximately 2 by 3 cm and connected immediately to the resonator by means of extremely short wires. Power to the circuit is provided by a very thin, twin insulated long cable. This wire is also used for the suspension of the apparatus as a pendulum. To do so, the wire is anchored at a hook connected to the positive line pole of the resonator, which is RF - de-coupled to ground. The length of suspension is approximately 2 metres. Care is taken to eliminate the possibility of interaction of the DC and AC currents involved in the pendulum arrangement with the magnetic field of the Earth. All DC current paths are bi-directional and thus self-canceling, while the AC current paths have by themselvesa a zero average value.The pendulum is set to swing at a small amplitude (2-3 cm) The period of swing is measured in sets of 5, to increase accuracy,.

OBSERVED BEHAVIOR

It is observed that the period of mechanical oscillations of the pendulum thus formed is influenced by the magnitude of RF current at resonance, which is a function of the effective Q of the tank circuit and the electrical parameters of the power oscillator driving it. The period of oscillations is increased when the scillator is powered, which implies that the acceleration of gravity in the vicinity of the tank circuit and the oscillator is decreased accordingly. The weight of the oscillator/tank circuit can also be observed to reduce. The maximum equivalent reduction of g locally is calculated to - 1.3% This behavior of the tank circuit is consistent with the basic theory displayed in the research work [1]

CONCLUSION

A gravity - interacting field can be generated electromagnetically and used to reduce the gravity vector locally. Its implementation utilzes the horizontal projections of electric currents, intensified through almost conventional RF techniques.

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REFERENCES

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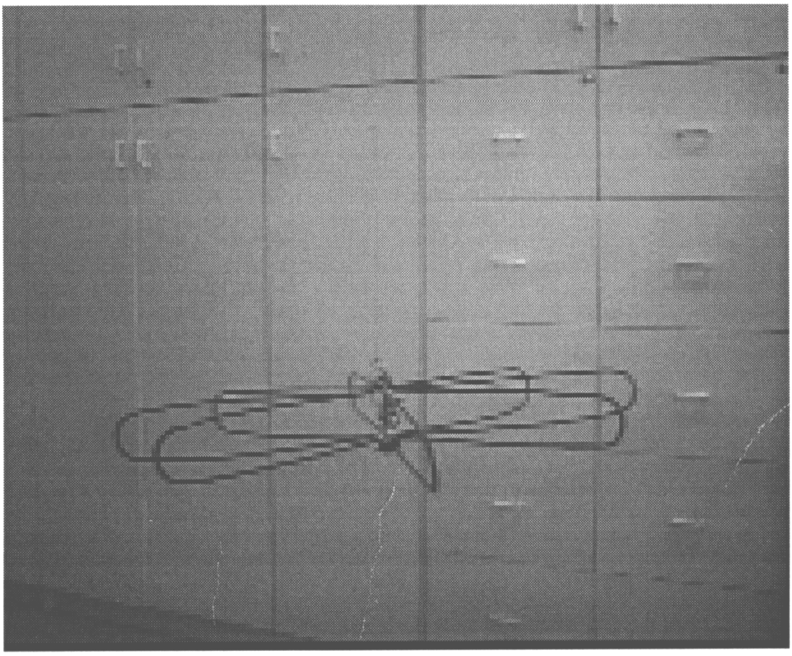

Above: **The oscillator/tank circuit assembly hung as a pendulum on a very thin twin wire, carrying the DC supply to the circuit.**

Below: **Detail of the mounting of the oscillator inside the tank circuit. The oscillator operates in C-class, so no heavy wiring to the tank circuit is needed**